

The African Organisation for Standardisation

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ARS 825 (2012) (English): Yams --
Specification



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Yams — Specification



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Foreword

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ARSO Central Secretariat
International House 3rd Floor
P. O. Box 57363 — 00200 City Square
NAIROBI, KENYA

Tel. +254-20-224561, +254-20-311641, +254-20-311608

Fax: +254-20-218792

E-mail: arso@arso-oran.org

Web: www.arso-oran.org

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ARSO Central Secretariat
International House 3rd Floor
P.O. Box 57363 — 00200 City Square
NAIROBI, KENYA

Tel: +254-20-224561, +254-20-311641, +254-20-311608
Fax: +254-20-218792

E-mail: arso@arso-oran.org
Web: www.arso-oran.org

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Introduction

Yams (*Dioscorea* sp.) are the second most important tropical root, or tuber, crop after cassava. But yams are better food than cassava, and while they are usually thought to be more difficult to grow, under some conditions yams outperform cassava. Yams fill an important role in the diet of many areas of the tropics—a role that can increase in importance. That role and its potential are not, however, well understood.

Yams are a rich source of carbohydrates and other human nutritional elements. The major production areas for yams are in West Africa on a belt stretching from the Congo basin tropical forests through Cameroon and westwards to Ghana and beyond. In East Africa, yams traditionally constituted an important part of dishes and were a highly valued crop in past generations. In addition to food value, yams had cultural application in many communities. Presently, due to low production and scarcity in markets, yam tubers are one of the most expensive food commodities in East Africa.

Yams are produced on 5 million hectares in about 47 countries in tropical and subtropical regions of the world. Yields are about 11 t/ha in the major producing countries of West Africa. According to FAO statistics, 48.7 million tonnes of yams were produced worldwide in 2005, and 97% of this was in sub-Saharan Africa. West and Central Africa account for about 94% of world production. Nigeria is the leading producer with 34 million tonnes followed by Côte d'Ivoire (5 million tonnes), Ghana (3.9 million), and Bénin (2.1 million tonnes). Ethiopia (174 000 t) and Sudan (137 000 t) are the major producers in East Africa. Colombia (333 000 t) leads the production in South America followed by Brazil (230 000 t), while Japan (204 000 t) is the leader in Asia. Yams are also important in the Caribbean (e.g., Haiti with 197 000 t in 2005), and the South Pacific Islands. Ghana exports the largest quantity of yams (about 12 000 t) annually. Average yam consumption per capita per day is highest in Bénin (364 kcal) followed by Côte d'Ivoire (342 kcal), Ghana (296 kcal), and Nigeria (258 kcal).

Yam is a high value commodity but the full potential for income generation both through domestic markets and the export trade has not been realised due to problems and inefficiencies in the production, handling and trading systems. In the case of export this is clearly illustrated by problems of bad/inconsistent quality of yams on arrival at countries of importation. This African standard seeks to improve the quality of yams destined for both local and overseas markets and to create a common understanding between yam producers, exporters and consumers in order to accrue gains from trade in yams.

The use of grades in this standard will have the following benefits:

- a) Promotes the incentives for quality and safety;
- b) Makes it possible to buy produce that one has not seen previously;
- c) Facilitates price/quality comparison;
- d) Reduces the risk of deception and fraudulent marketing;
- e) Helps define contracts for delivery

The documents consulted in the development of this standard are listed in the Bibliography.

Yams — Specification

1 Scope

This standard applies to yams of varieties (cultivars) grown from *Dioscorea spp.* to be supplied fresh to the consumer in domestic and international trade, yams for industrial processing being excluded. The purpose of this standard is to specify the minimum grade requirements of the tubers at the dispatching stage.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Prepackaged foods — Labelling*

CAC/GL 21, *Principles for the establishment and application of microbiological criteria for foods*

CAC/RCP 44, *Recommended international code of practice for the packaging and transport of tropical fresh fruits and vegetables*

CAC/RCP 53, *Code of hygienic practice for fresh fruits and vegetables*

3 Definitions

For the purpose of this standard the following definitions apply.

3.1

blemish

any physical injury affecting the surface of the produce, such as scars, healed cracks and discoloured spots, which detracts from its natural appearance, but will not significantly affect its shelf life

3.2

similar varietal characteristics

tubers in any lot or container have the same general shape, colour characteristic of skin and flesh

3.3

fresh

tubers maintain their reaped appearance and are not weathered or showing signs of dehydration

3.4

fully mature

the tubers have reached full development and are firm with a tough skin and with no sprouting or surface shrivelling

3.5

firm

tubers are not soft, shrivelled or flabby

3.6

damage

any defect or combination of defects of physical or physiological (external or internal) causes which detracts from the edible or marketing quality such as bruises or growth cracks

3.7

serious damage

any defect or combination of defects of physiological or physical (external or internal) causes such as cuts or internal degradation which could lead to the abnormally quick deterioration of the tuber and cause rejection

3.8

disease

any defect or combination of defects caused by micro-organisms

3.9

weight

the weight stated on the container which is the minimum net weight delivered to the customer.

3.10

cut surface

exposed surface of the tubers resulting from the removal of either damaged areas, yam heads or toes

3.11

clean (visual)

free from adhering soil, insects, chemical deposits and other foreign matter

3.12

nematode damage

scarring and discolouration (burning) caused by the feeding of nematode on the surface of the yam, or lesions extending into the flesh of the yam

3.13

well-shaped

the tubers have the shape characteristic of the variety, with not more than two toes

3.14

fairly well shaped

85% of the tubers are not curved, crooked or palm with not more than three toes

3.15

white surface

tubers exhibit some degree of immaturity as seen on the external surface at the tip of the tuber

3.16

mature

stage of maturity that allows the produce to possess the necessary quality characteristics that is desired by the consumer

4 Provisions concerning quality

4.1 General

The purpose of the standard is to define the quality requirements of yams at the market control stage after preparation and packaging.

However, if applied at stages following export, products may show in relation to the requirements of the standard:

- a slight lack of freshness and turgidity,
- for products graded in classes other than the Grade I, a slight deterioration due to their development and their tendency to perish.

The holder/seller of products may not display such products or offer them for sale, or deliver or market them in any manner other than in conformity with this standard. The holder shall be responsible for observing such conformity.

4.2 Minimum requirements

Yam shall be of similar varietal characteristics, cylindrical shape, clean, fully mature, fresh, firm, and free from diseases, decay, pest (nematode, weevil, worm, etc.) and pest damage and mechanical injuries (bruises, cracks, compression etc.).

4.3 Grade requirements

All grades shall meet the minimum requirements as well as the following additional requirements:

4.3.1 Grade I

- a) Fairly well-shaped — Cylindrical shape, typical of the variety. Not crooked or flattened.
- b) Free from damage
- c) Free from white surface
- d) Not more than 2 cut surface areas
- e) Superior appearance — Completely free of toes, white tip, worm, weevil, nematode damage, cracks, bruises, sprouts, decay, mould growth, and any other defects.
- f) Firm and fresh — Tough skin with no surface shrivelling.

4.3.2 Grade II

- a) Shape — Fairly well-shaped
- b) Free from damage
- c) Not more than 3 cm white surface area
- d) Not more than 3 cut surfaces
- e) Firm — Tough skin with no surface shrivelling.
- f) Appearance — Not more than 2 toes. Completely free from nematode damage, cracks, bruises, white tip, sprouts, decay, mould growth and any other defects.

4.3.3 Grade III

- a) Shape — Fairly well shaped.
- b) Firmness — Fairly tough skin.
- c) Appearance — Not more than 3 cm white surface area.
- d) Free from serious damage and absence of decay and mould growth.

5 Provisions concerning sizing

5.1 General

Size is determined by weight.

Size	Weight (range in kg)
Large	>5.5
Medium	3.0 to 5.5
Small	<3.0

NOTE Size in each grade will be dependent on the market requirement. The size of produce packed in any standard type shipping container shall be specific.

5.2 Size tolerances

For all grades, ten per cent (10%) by number or weight of yam corresponding to the size immediately below or above the size indicated on the package.

6 Provisions concerning tolerances

6.1 Grade I

Not more than 5 % by number or weight of yam shall fail to meet the requirements of this grade but must meet those of Grade 2.

There shall be zero tolerance for damage at the dispatch stage.

6.2 Grade II

Not more than 10 % by number or weight of yam shall fail to meet the requirements of this grade but meeting the requirements of Grade 3.

Damage shall not exceed more than 2 % at the dispatching stage.

6.3 Grade III

Not more than 10 % by number or weight of yam shall fail to meet the minimum quality and grade requirements

7 Provisions concerning presentation

7.1 Uniformity

The contents of each package must be uniform and contain only yams of the same origin, variety, quality and degree of maturity.

7.2 Packaging

7.2.1 Yams shall be packed in such a way as to protect the produce properly. Packages must be of good quality, hygiene, ventilation, strength and characteristics to protect the produce during transport and handling.

7.2.2 The materials used inside the package must be clean and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials, particularly paper or stamps bearing trade specifications, is allowed, provided the printing or labelling has been done with non-toxic ink or glue.

7.2.3 Stickers individually affixed to the produce shall be such that, when removed, neither leave visible traces of glue, nor lead to skin defects.

7.2.4 Packages must be free of all foreign matter. A visible lack of cleanliness in several packages could result in the goods being rejected.

7.3 Presentation

The visible part of the contents of the package must be representative of the entire contents. A special effort should be made to suppress camouflage, i.e. concealing in the lower layers of the package produce inferior in quality and size to that displayed and marked.

Similarly prohibited is any packaging method or practice intended to give a deceptively superior appearance to the top layer of the consignment.

7.4 Factors for maintaining quality and increase in shelf life

7.4.1 Washing method

Yam should be washed in potable water to remove foreign matter.

7.4.2 Pre-cooling method

Air cooling

7.4.3 Storage temperature

13 °C to 16 °C (70 to 80% Relative Humidity)

8 Labelling or marking

8.1 Consumer packages

8.1.1 Labelling of retail containers shall comply with the requirements of ARS 56.

8.2 Non-retail containers

Each package¹ must bear the following particulars in letters grouped on the same side, legibly and indelibly marked, and visible from the outside:

8.2.1 Identification

The exporter, packer and/or dispatcher shall be identified by name and physical address (e.g. street/city/region/postal code and, if different from the country of origin, the country) or a code mark officially recognized by the national authority.²

8.2.2 Nature of produce

- "Yams", if the contents are not visible from the outside
- Common name of produce and /or botanical name.
- Variety
- Net weight of package (kg)
- Number of produce per container (count)

¹ Package units of produce prepacked for direct sale to the consumer shall not be subject to these marking provisions but shall conform to the national requirements. However, the markings referred to shall in any event be shown on the transport packaging containing such package units.

² The national legislation of a number of countries requires the explicit declaration of the name and address. However, in the case where a code mark is used, the reference "packer and/or dispatcher (or equivalent abbreviations)" has to be indicated in close connection with the code mark, and the code mark should be preceded by the ISO 3166 (alpha) country/area code of the recognizing country, if not the country of origin.

— Grower/lot identification number

— Storage temperature

8.2.3 Origin of produce

Country of origin and, optionally, district where grown, or national, regional or local place name.

8.2.4 Commercial specifications

Grade

8.2.5 Official control mark (optional)

8.2.6 Postharvest chemical treatment, if any

9 Contaminants

9.1 General

Fresh yams shall be free of any biological (bacteria, virus, parasites, fungus, etc.), chemical (pesticide, allergens, etc.) or physical (metal, glass, wood, hard plastic, etc.) agent, foreign matter or other substances not intentionally added to food which may compromise food safety or suitability.

9.2 Heavy metals

Yams shall comply with those maximum levels for heavy metals established by the Codex Alimentarius Commission for this commodity.

9.3 Pesticide residues

Yams shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this commodity.

10 Hygiene

10.1 It is recommended that the produce covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of ARS 53, CAC/RCP 53, and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

10.2 The produce should comply with any microbiological criteria established in accordance with CAC/GL 21.

Annex A
(normative)

Unacceptable defects



Mould



Mis-shaped yellow yam



Nematode damage



Immature yam

Annex B
(informative)

Commercial species and varieties of yams

Species/Common name	Period from planting to maturity	Yield and size of tubers	Occurrence and significance
<i>Dioscorea alata</i> Water yam; Winged yam; Purple yam	220-300 days	20-25 t.ha ⁻¹ 1-3 tubers per plant 5-10 kg per tuber	Native to Southeast Asia Most widely of cultivated yam: Asia, Pacific islands, Africa, and West Indies. Second to white yam in Africa
<i>Dioscorea Bulbifera</i> Potato yam; air potato	140-180 days; 90-120 days	Aerial: 2-15 t.ha ⁻¹ ; 3-5 t.ha ⁻¹ Underground: 2-8 t.ha ⁻¹	Asia and Africa. Bulbilis produced at base of leaves used for food.
<i>Dioscorea Cayenensis</i> Yellow yam	280-350 days	30 t.ha ⁻¹ 2 kg per tuber (mean) 7-10 kg per tuber (highest)	Native to Africa. Now considered same as <i>Dioscorea alata</i>
<i>Dioscorea Dumentorum</i> Bitter yam	240-300 days	> those of most other cultivated West Africa yams	Popular as a vegetable in parts of West Africa.
<i>Dioscorea esculenta</i> Lesser yam	200-300 days	7-20 t.ha ⁻¹ 25-35 t.ha ⁻¹ (exceptional) 5-20 tubers per plant	Native to Southeast Asia. Third most cultivated in world.
<i>Dioscorea Opposita</i> Chinese yam	24 weeks	4-6 t.ha ⁻¹	Native to China. Smaller than African yam. Grown in China, Korea, and Japan
<i>Dioscorea rotundata</i> White yam	200-330 days	16-20 t.ha ⁻¹	Native to Africa
<i>Dioscorea trifida</i> Cush-cush yam	280-330 days	15-20 t.ha ⁻¹	Native to the Guyana region of South America and is the most important cultivated New World yam

Products from yams

Fresh yam

Candied yams

Poundo yam (flour)

Yam flour

Yam noodles

Yam chips

Yam crisps

Bibliography

In the preparation of this African Standard, the following sources were consulted extensively:

Ghana Standard, GS 150:2011, *Specification for fresh yams*

CODEX STAN 193:1995 (Rev.5:2009), *General Standard for Contaminants and Toxins in Foods*

CODEX STAN 228:2001 (Rev.1:2004), *General methods of analysis for contaminants*

Ministry of Agriculture and Lands Standard Specification for Negro Yam

Yam — Postharvest care and market preparation, FAO, 2004

Assistance derived from these sources and others inadvertently not mentioned is hereby acknowledged.

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